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ABSTRACT

A project to identify competencies needed by students entering college was undertaken jointly by the New Mexico Department of Education and the Commission on Higher Education. The first step was to review statewide data on enrollment in developmental/remedial college courses of graduates from New Mexico's public secondary schools. After a description of the plan for the project, the competencies are identified under the following skill categories: (1) language arts (reading and literature, writing, speaking and listening, language principles); (2) fine arts (visual arts, theater, music, and dance); (3) mathematics (basic mathematics skills; competencies in algebra, geometry, functions, computing, and statistics; the relationship of mathematics to the other basic academic competencies); (4) science competencies (laboratory and field work, mathematical skills, fundamental concepts, and detailed knowledge in biology, chemistry, and physics); and (5) social studies (general abilities and competencies in social science, world history and U.S. history). Initiatives for language arts, fine arts, mathematics, science, and social studies are proposed. Recommendations for institutional research are also offered. A list of members of project committees is appended. (SW)

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ACADEMIC PREPARATION FOR COLLEGE: A JOINT PROJECT

Final Report
April 1987

NEW MEXICO
DEPARTMENT OF EDUCATION

Alan D. Morgan
Superintendent
of Public Instruction

NEW MEXICO
COMMISSION ON HIGHER EDUCATION

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ACADEMIC PREPARATION FOR COLLEGE: A JOINT PROJECT OF THE NEW MEXICO DEPARTMENT OF EDUCATION AND THE COMMISSION ON HIGHER EDUCATION

PART I: INTRODUCTION

Purpose

Students entering postsecondary education deserve a reasonable chance of success. And while many factors affect success in postsecondary education, academic preparation received by high school students is a prime one. Public institutions of higher education in New Mexico enroll more than 65,000 students, and most of these are products of New Mexico's public secondary schools. The Academic Preparation for College Project seeks to improve academic preparation for these New Mexicans.

After reviewing statewide data pertaining to enrollment in developmental/remedial college courses by students who have graduated from New Mexico's secondary schools, the New Mexico State Board of Education (SBE) and the New Mexico Commission on Higher Education (CHE) adopted a project to identify academic competencies necessary for success in postsecondary education. This report describes the plan and presents the competencies that were identified by statewide committees of educators from New Mexico's public schools and colleges and universities.

The National Concern for Quality Education

Recent national studies, including that of the National Commission on the Role and Future of State Colleges and Universities chaired by former U.S. Secretary of Education Terrence Bell, outline challenges facing undergraduate education and identify some of the social, political, economic, and educational conditions that forecast turbulence in U.S. higher education. The Bell study, "To Secure the Blessings of Liberty," discusses academic quality:

> Perhaps no concern about higher education has attracted more attention than the quality of undergraduate education. Most frequently the concern is expressed in terms of deficiencies exhibited by many college graduates in their communication skills, their ability to solve quantitative problems, their knowledge about the

world around them, and their competence as critical thinkers.

For example, three recent national studies by the National Endowment for the Humanities (NEH), the National Institute of Education (NIE), and the Association of American Colleges (AAC), collectively constitute a most serious indictment of U.S. higher education and, indeed, of the entire academic profession.

Evidence of devaluation in college curriculums is everywhere. The business community complains of difficulty in recruiting literate college graduates. Remedial programs, designed to compensate for lack of skill in using the English language, abound in the colleges and in the corporate world. Writing as an undergraduate experience, as an exploration of both communication and style, is widely neglected. (AAC)

More recently, three other agencies---the Carnegie Task Force on Teaching as a Profession, the Education Commission of the States (ECS), and the National Governor's Association (NGA)---issued major reports on quality in undergraduate education and the need for dramatic structural changes in policies and practices in the field of teacher education---a professional area of particular concern to state colleges and universities. ECS, in its report, found that "too many students are entering college without the knowledge, skills and attitudes necessary for success in college, a gap [that] will inevitably widen as the nation changes its expectations about what people should know."

The Preparation Gap in New Mexico

In New Mexico last year the State Department of Education (SDE) once again reviewed statewide data pertaining to enrollment in developmental and remedial college courses by students who have graduated from New Mexico's public secondary schools. For several years it has been noted that many students entering New Mexico's institutions of higher education are enrolled in courses designed to provide basic academic skills necessary for college level course work. While these courses are offered under a variety of programs, such as basic skills, developmental studies, remedial education, and renewal centers, they exist at all of the state's colleges and universities. And while the number of students participating in these programs varies greatly among the institutions, overall more than forty percent of freshmen were

enrolled in one or more of these courses during the 1984 Fall Semester. Three significant factors contributing to this high participation rate include (1) criteria used for admission into the institutions, (2) criteria used for placement into these courses, and (3) lack of adequate preparation in high school.

When the academic criteria for admission into a university are set low, or are not in existence at all, a larger number of students requiring these courses are admitted than when criteria for admission are more rigorous. It should be noted, however, that by having lower standards for admission, a number of individuals will eventually be able to profit from postsecondary education who would not otherwise be able to do so. Historically, New Mexico's general open admission policies have been part of the state's commitment to access to postsecondary education for its citizens.

Once admitted to a public college or university, students need to be placed in basic skills courses according to need. A review of the criteria used for placement among the state's higher education institutions reveals a great deal of variability in these criteria. Placement at some institutions is dependent upon standardized test cutoff scores which reflect low national percentiles, while at other institutions cutoff scores are at the national average. In addition at most of the state's higher education institutions, individual students retain the right to enroll in these courses regardless of the criteria used by the institution for mandatory placement. Thus, students whose academic skills are actually quite adequate may still be enrolled in these courses due to lack of confidence or a desire to "brush up." This may be especially true for students returning to formal education after an absence of a few years.

A third major factor which contributes to the high enrollment in basic skills courses is a lack of adequate academic preparation prior to enrollment in postsecondary education. Many students either fail to take the courses necessary for such work, or do not profit from enrollment in such courses. This inadequate preparation may be due to a lack of understanding on the part of individual students about what is necessary for success in college or, in some cases, a lack of such understanding on the part of teachers, counselors, and curriculum designers in the high schools.

Definition of Academic Preparation Needed

Educators from throughout the state have suggested that a useful solution to both the problems of admissions and placement faced by the colleges and universities, and the lack of adequate student preparation for college would be an explicit description of the academic skills necessary for success in postsecondary

education. Such a description would enable higher education institutions to define more precisely and with appropriate uniformity their criteria for admissions and placement in basic skills courses and would also allow for a better understanding about what is expected in college performance on the part of high school students and their parents, teachers, counselors, and administrators. Once expectations were understood, curricula and course structure could then be reviewed and improved by local school districts resulting in increased opportunity for students to be adequately prepared for college level courses. An important result of this effort toward identification of specific skills necessary for success in college would be an increase in the number of students prepared to enroll in college level classes in the colleges and universities---a result that students, educators, government officials, and taxpayers would all applaud. It is toward this goal that the joint effort of the New Mexico Department of Education and the Commission on Higher Education was directed.

Organization of the Academic Preparation for College Project

State Department officials approached the Council of University Presidents and the Commission on Higher Education for support in a collaborative project between high schools and colleges with goals of improving high school curriculum, reducing student under-preparedness for college, and improving the quality of student learning in both primary and secondary schools and in higher education institutions.

With the support of both two-year and four-year institutions through the Instructional Council and the Academic Council, the Commission on Higher Education and the State Department of Education co-sponsored a conference to define competencies and skills required for success in college level work. The conference brought together high school and college teachers in like disciplines from across the state in September and October, 1986. These outstanding educators (listed in the Appendix), who brought with them unique and valuable experiences, perspectives and skills, were selected by their schools and colleges to serve on committees to accomplish the major work of the project. The higher education institutions provided travel and per diem for participation, and the local school districts provided professional leave and in many cases transportation expenses.

Strong support was also provided for this project in the excellent conference presentations of Commission Executive Director Dewayne Matthews, State School Superintendent Alan Morgan, College Board President George Hanford, and State Senator Marvin Watts.

The subject area committees of the project included language arts, mathematics, science, social studies, and fine arts. Specifically, the goals for each subject area committee were (1)

to identify clearly those competencies and skills required for success in college level work; and (2) to identify initiatives that need to be taken to realize the competencies and skills that are identified.

In addition to these educational assessments, an institutional research committee also met to determine what data are appropriate for reporting to New Mexico school districts regarding the performance of students attending New Mexico colleges and universities.

The "Green Book" -- A Point of Reference

As a foundation for these discussions, the five academic area committees utilized material developed and published by The College Board Corporation which addressed these same issues. The publications were Academic Preparation For College: What Students Need To Know And Be Able To Do (The College Board, New York, 1983), referred to as the "Green Book," and five companion publications each specific to one of the academic disciplines, the "Rainbow Books" (College Entrance Examination Board, New York, 1985, 1986). The College Board is an organization made up of over 2500 institutions of higher and secondary education across the country. The development of these materials began in 1980 with over 200 college and high school teachers participating in the effort. This process included reviews by members of professional associations, parents, and students. In addition, 24 formal dialogues were held across the country in which college and high school teachers participated. The competencies contained in the Green Book were approved by The College Board's Council on Academic Affairs in 1983. The Rainbow Books were developed as more detailed sequels to the Green Book and were made available in 1986, after similar review procedures.

Each subject area committee of the New Mexico project was asked to review material from the Green Book and the appropriate Rainbow Book as a resource for suggesting competencies for adoption in New Mexico. For help in these efforts, each committee included an educator who had contributed to the College Board's effort as a consultant. Their names are included in the Appendix.

PART II: THE ACADEMIC COMPETENCIES

The committee co-chairs prepared the recommendations of each committee. Before providing a brief description of each of the committee recommendations, it should be noted that all five academic area committees were basically in accord with the academic competencies found in The College Board's Green Book and accompanying Rainbow Books. In addition, these competencies should be viewed as descriptive of skills important for success in college, but not prescriptive as to the high school curricula of local districts.

In evaluating their experiences at the conference, participants commonly responded that (1) communication between high school and college teachers regarding mutual difficulties and expectations was a primary positive achievement; (2) this communication should continue; and (3) they were willing to continue to participate in committee work.

The material below can be found in the publication Academic Preparation For College: What Students Need To Know And Be Able To Do (the Green Book).

The Language Arts Competencies

1. Reading and Literature

   a. The ability to read critically by asking pertinent questions about what they have read, by recognizing assumptions and implications, and by evaluating ideas.

   b. The ability to read a literary text analytically, seeing relationships between form and content.

   c. The ability to read with understanding a range of literature, rich in quality and representative of different literary forms and various cultures.

   d. Interest in and a sense of inquiry about written works.

   e. The ability to respond actively and imaginatively to literature.

2. Writing

   a. The recognition that writing is a process involving a number of elements, including collecting information and formulating ideas, determining their relationships, drafting, arranging paragraphs in an appropriate order and

building transitions between them, and revising what has been written.

b. The ability to write as a way of discovering and clarifying ideas.

c. The ability to write appropriately for different occasions, audiences, and purposes (persuading, explaining, describing, telling a story).

d. Skill and assurance in using the conventions of standard written English.

3. Speaking and Listening

a. The ability to engage in discussion as both speaker and listener -- interpreting, analyzing, and summarizing.

b. The ability to contribute to classroom discussions in a way that is readily understood by listeners -- that is, succinct and to the point.

c. The ability to present an opinion persuasively.

d. The ability to recognize the intention of a speaker and to be aware of the techniques a speaker is using to affect an audience.

e. The ability to recognize and take notes on important points in lectures and discussions.

f. The ability to question inconsistency in logic and to separate fact from opinion.

4. Language Principles

a. English, like every other language, operates according to grammatical systems and patterns of usage.

b. English continues to undergo change.

c. English is influenced by other languages, both ancient and modern.

d. English has several levels of usage, and consequently the language appropriate in some situations may not be appropriate in others.

e. English has many dialects.

f. English words, like those of other languages, gather meaning from their context and carry connotation.

The Fine Arts Competencies

1. <u>Students going to college will profit from the following preparation in the arts.</u>

   a. The ability to understand and appreciate the unique qualities of each of the arts.

   b. The ability to appreciate how people of various cultures have used the arts to express themselves.

   c. The ability to understand and appreciate different artistic styles and works from representative historical periods and cultures.

   d. Some knowledge of the social and intellectual influences affecting artistic form.

   e. The ability to use the skills, media, tools, and processes required to express themselves in one or more of the arts.

2. <u>College entrants also will profit from more intensive preparation in at least one of the four areas of the arts: visual arts, theater, music, and dance.</u>

   a. If the preparation of college entrants is in the VISUAL ARTS, they will need the following knowledge and skills.

      (1) The ability to identify and describe -- using the appropriate vocabulary -- various visual art forms and different historical periods.

      (2) The ability to analyze the structure of a work of visual art.

      (3) The ability to evaluate a work of visual art.

      (4) To know how to express themselves in one or more of the visual art forms, such as drawing, painting, photography, weaving, ceramics, and sculpture.

   b. If the preparation of college entrants is in THEATER, they will need the following knowledge and skills.

      (1) The ability to identify and describe -- using appropriate vocabulary -- different kinds of plays from different historical periods.

      (2) The ability to analyze the structure, plot, characterizations, and language of a play,

both as a literary document and as a theater production.

(3) The ability to evaluate a theater production.

(4) To know how to express themselves by acting in a play or by improvising, or by writing a play, or by directing or working behind the scenes of a theater production.

c. If the preparation of college entrants is in MUSIC, they will need the following knowledge and skills.

(1) The ability to identify and describe -- using the appropriate vocabulary -- various musical forms from different historical periods.

(2) The ability to listen perceptively to music, distinguishing such elements as pitch, rhythm, timbre, and dynamics.

(3) The ability to read music.

(4) The ability to evaluate a musical work or performance.

(5) To know how to express themselves by playing an instrument, singing in a group or individually, or composing music.

d. If the preparation of college entrants is in DANCE, they will need the following knowledge and skills.

(1) The ability to identify and describe -- using the appropriate vocabulary -- dances of various cultures and historical periods.

(2) The ability to analyze various techniques, styles, and choreographic forms.

(3) The ability to evaluate a dance performance.

(4) To know how to express themselves through dancing or choreography.

The Mathematics Competencies

The central role of the study of mathematics in preparing students for college has long been acknowledged by society, but

the need for high levels of preparation has not always been appreciated. Neither individual students nor society itself should accept a level of mathematical literacy that restricts opportunities for career choices and personal advancement. In the 1980s and 1990s students preparing for college will need more and better preparation in mathematics than has been required of them in the past.

The mathematics competencies provided in the Green Book were edited by the committee. These edited competencies are presented here.

1. General Competencies in Mathematics that Should Be Developed and Used in All High School Courses

   a. The ability to perform the computations of addition, subtraction, multiplication, and division using rational numbers, integers, fractions, and decimals.

   b. The ability to make and use measurements in both traditional and metric units.

   c. The ability to use the mathematics of rationals in fraction and decimal form, ratios, proportions and percentages, roots and powers.

   d. The ability to make estimates and approximations, and to judge the reasonableness of a result.

   e. The ability to formulate and solve a problem in mathematical terms.

   f. The ability to select and use appropriate approaches and tools in solving problems, including mental computation, trial and error, paper-and-pencil techniques, calculator, and computer.

   g. The ability to use elementary concepts of probability and statistics.

   h. The ability to reason inductively and deductively.

   i. The ability to use the concepts of algebra.

   j. The ability to use the concepts of geometry, including the computation of area and volume, and spatial perception.

2. Basic Mathematical Skills

   a. In the coming decade, all college entrants will need to achieve proficiency in the following basic mathematical skills:

(1) The ability to apply mathematical techniques to solve real-life problems.

(2) The ability to use the language and notation of mathematics to express quantitative ideas with precision.

(3) The ability to use computers and/or calculators.

(4) Familiarity with the basic concepts of statistics and statistical reasoning.

(5) Knowledge in considerable depth and detail of algebra, geometry, and functions.

(6) Knowledge of axiomatic structure.

3. Algebra

a. College entrants will need:

(1) Skill in solving equations and inequalities.

(2) Skill in operations with real numbers.

(3) Skill in simplifying algebraic expressions, including simple rational and radical expressions.

(4) Familiarity with permutations, combinations, simple counting problems, and the binomial theorem.

b. Those students who will take advanced mathematics in college will need additional preparation in high school, including:

(1) Skill in solving trigonometric, exponential, and logarithmic equations.

(2) Skill in operations with complex numbers.

(3) Familiarity with arithmetic and geometric series and with proofs by mathematical induction.

(4) Familiarity with simple matrix operations and their relation to systems of linear equations.

4. Geometry

a. College entrants will need:

(1) Knowledge of two-dimensional and three-dimensional figures and their properties.

(2) The ability to think of two-dimensional and three-dimensional figures in terms of symmetry, congruence, and similarity.

(3) The ability to use the Pythagorean theorem and special right-triangle relationships.

(4) The ability to draw geometrical figures and use geometrical modes of thinking in solving problems.

(5) Appreciation of the role of proofs.

b. Those students who plan to enter fields that will require advanced mathematics courses in college will need additional work in geometry beyond the topics listed above. They will need at least the following:

(1) The ability to write proofs.

(2) Knowledge of analytic geometry in the plane.

(3) Knowledge of the conic sections.

(4) Familiarity with vectors and with the use of polar coordinates.

5. Functions

a. College entrants will need:

(1) Knowledge of relations, functions, and inverses.

(2) The ability to graph linear and quadratic functions and use them in the interpretation and solution of problems.

b. Students who will study advanced mathematics in college need to understand other functions, such as the cube root, trigonometric functions, and the exponential function. They should represent these functions graphically and study the behavior of a function as it is transformed in various ways. They need to know the composition and the algebra of functions. These students need the following:

(1) Knowledge of various types of functions including polynomial, exponential, logarithmic, and circular functions.

(2) The ability to graph such functions and to use them in the solution of problems.

6. Computing

a. College entrants will need:

(1) The ability to use mental computation and estimation to evaluate calculator and computer results.

(2) Familiarity with the methods used to solve mathematical problems when calculators or computers are the tools.

(3) Familiarity with appropriate uses and limitations of computers.

b. Those students who are expecting to major in science, engineering, or business in college, or who expect to take advanced courses in mathematics or computer science, will need additional preparation in computing. They should be able to do more than simply use programs and should have a general familiarity with how computer methods operate. They will need the following more extensive mathematical proficiency.

(1) The ability to write computer programs to solve a variety of mathematical problems.

(2) Familiarity with the methodology of developing computer programs and with the considerations of design, structure, and style that are an important part of this methodology.

7. Statistics

a. College entrants will need:

(1) The ability to gather and interpret data and to represent them graphically.

(2) The ability to apply techniques for summarizing data, using such statistical concepts as average, median, and mode.

(3) Familiarity with techniques of statistical reasoning and common misuses of statistics.

b. If students intend to pursue majors or careers requiring advanced mathematics courses in college, they will need more preparation in statistics.

They should have opportunities in high school to use the computer to model experimental situations, analyzing the mathematics needed in the model. They should understand and be able to use such techniques as random number generators to study the simulated behavior of individual organisms or social systems. They should be able to apply counting techniques and concepts relating to permutations and combinations to solve realistic problems. They also will need more extensive grounding in probability theory, although a rigorously deductive approach should be avoided. The additional preparation they need includes the following:

(1) Understanding of simulation techniques used to model experimental situations.

(2) Knowledge of elementary concepts of probability needed in the study and understanding of statistics.

8. The Relationship of Mathematics to the Other Basic Academic Competencies: The basic academic competencies are reading, writing, speaking and listening, mathematics, reasoning, and studying. Mathematics is unique in that it is both a basic academic competency and a basic academic subject. It is a subject that provides students with a family of specialized languages and associated skills for dealing with quantitative problems from all fields of endeavor. Simultaneously, it is one of the liberal arts whose mastery has marked an educated person since the time of Plato. The study of mathematics not only reinforces the other basic academic competencies, but it also relies on them.

a. Reading: Critical reading is vital to the study of mathematics. To read and comprehend a symbolic mathematical expression requires that each symbol be read and given an unambiguous interpretation, that Key symbols be given special attention, that the relations between symbols be understood, and that relevant rules for operating with the symbols be recalled. The reader must be able to examine such an expression bit by bit, if necessary, to be sure that one small symbol--an exponent, for example--is not misread. At the same time, the reader should be able to "take in the expression at a glance," so to speak, to decide whether or not it is of a familiar type to which standard procedures apply.

b. Writing: Written communication in the study of mathematics includes many forms: notetaking, recording of sequential steps in solutions of algebraic problems, proofs in a variety of formats, documentation of computer programs, descriptions of algorithms, and explanations of mathematical situations. Each is important in acquiring the skills of selecting and restructuring ideas to communicate a coherent message.

These skills of written communication in mathematics are not learned automatically; they must be taught and practiced. Teachers who have students keep journals to record class discussions, problem solutions, and their own observations about a mathematical topic find that the discipline of maintaining a written record helps students to remember key ideas and see relationships among the various topics in the course. When asked to write an explanation of a topic, students who have kept a journal write more thoughtful papers because they have learned the advantage of writing one's preliminary thoughts before attempting to write a finished essay.

c. Speaking and Listening: Students who are given the opportunity to speak to their classmates about a mathematical problem not only enhance their understanding of the mathematics involved but also develop skill in organizing and presenting ideas orally. Students can develop skills in critical listening by evaluating the coherence and completeness of a spoken mathematical argument.

d. Reasoning: The study of high school mathematics requires that students understand something of both inductive and deductive reasoning. Formal proofs are by no means necessary for the student to begin to appreciate the power of deductive reasoning in mathematics. Even in introductory courses, students can be encouraged to state reasons for the key steps they are taking in solving a mathematical problem. Students also need to understand how inductive reasoning works in mathematics through assignments in which they investigate a pattern such as the sequence of sums, 1, 3+5, 7+9+11, 13+15+17+19, . . . ; or the number of regions into which 1, 2, 3, 4, or more chords divide the interior of a circle, and then conjecture the general law suggested by these cases. Students who are given opportunities to test their conjectures learn that some conjectures may be wrong and that ultimately all valid

conjectures must be proved if they are to be used in further deductive arguments.

e. Studying: Although the study of mathematics often is thought of as a solitary pursuit, students engaging in collaborative study will experience mathematics as the cooperative activity it so often is in business and industry. When students work in pairs on an assignment, they teach and learn from each other. When students work on examination questions in a group, they gain valuable experience in using reading, writing, listening, and speaking skills. Tasks that require students to locate information on mathematics can help students develop research skills and learn how mathematics is used outside schools.

The Science Competencies

1. Laboratory and Field Work

   a. The ability to distinguish between scientific evidence and personal opinion by inquiry and questioning.

   b. The ability to recognize the role of observation and experimentation in the development of scientific theories.

   c. Sufficient familiarity with laboratory and field work to ask appropriate scientific questions and to recognize what is involved in experimental approaches to the solutions of such questions.

   d. The skills to gather scientific information through laboratory, field, and library work.

   e. The ability to organize and communicate the results obtained by observation and experimentation.

2. Mathematical Skills

   a. A quantitative understanding of at least one field of science -- an understanding that employs the basic mathematical proficiency for all college entrants outlined in the foregoing description of learning outcomes in mathematics.

   b. The ability to interpret data presented in tabular and graphic form.

c. The ability to draw conclusions or make inferences from data.

d. The ability to select and apply mathematical relationships to scientific problems.

e. The ability to use mathematical relationships to describe results obtained by observation and experimentation.

f. The ability to interpret, in nonmathematical language, relationships presented in mathematical form.

3. Fundamental Concepts: Understanding in some depth of the unifying concepts of the life and physical sciences such as cell theory, geological evolution, organic evolution, atomic structure, chemical bonding, and transformations of energy.

4. Detailed Knowledge: College entrants will need detailed knowledge of at least one field of science, ordinarily the field in which they have a quantitative understanding. This detailed knowledge could be in the earth sciences or in one of the newer, interdisciplinary fields of science. It could also be in one of the more traditional fields: biology, chemistry, or physics.

   a. IN BIOLOGY such detailed knowledge includes the central concepts, principles, and basic factual material of most, if not all, of the following topics: molecular and cellular aspects of living things, structure and function in plants and animals, genetics, evolution, plant and animal diversity and principles of classification, ecological relationships, and animal behavior.

   b. In CHEMISTRY such detailed knowledge includes the central concepts, principles, and basic factual material of most, if not all, of the following topics: states of matter, structure of matter, solutions, reactions of matter (including acid-base and oxidation-reduction), stoichiometry, energy changes in chemical reactions, equilibruim, kinetics, and descriptive chemistry (including periodic classifications, metals, nonmetals, and introductory organic chemistry).

   c. In PHYSICS such detailed knowledge includes the central concepts, principles, and basic factual material of most, if not all, of the following topics: mechanics, optics, wave phenomena, electricity and magnetism, heat and kinetic theory, atomic and nuclear physics, and relativity.

The Social Studies Competencies

The social studies competencies provided in the Green Book were edited by the committee. Those edited competencies are presented here.

1. General Abilities

   a. Basic understanding and interpretation of major political and economic institutions and their historical development.

   b. Basic understanding and interpretation of the social and cultural fields of history.

   c. An introductory knowledge of the content and concepts of the social sciences.

   d. Familiarity with major trends in the contemporary world (for example, nationalism or urbanization).

   e. An ability to utilize a variety of written, numerical, and visual forms of data.

   f. Familiarity with diverse interpretations of data.

   g. An ability to read and write from a social science perspective.

2. History: College entrants will need general knowledge and skills in economic, political, social and cultural history, as well as geographical characteristics of areas which are studied.

   a. An understanding of the relationship between present and past, including contrasts between contemporary institutions and values and those of the past, the reasons for these contrasts, and leading continuities between past and present.

   b. An understanding of how to approach the problem of change over time.

   c. An understanding of the principle of historical cause and effect.

   d. An understanding of major historical turning points.

   e. Some ability to develop historical interpretations.

3. World History

   a. The basic features of major societies and cultures

throughout the globe: their history, geography, major economic and social structures, political systems, and religions.

b. The historical developments underlying present connections and similarities among the world's peoples, and the major differences dividing them.

c. The chronology and significance of major events and movements in world history.

d. The international context of diplomacy and economics.

4. United States History

a. The basic features of major societies and cultures throughout the United States: their history, geography, major economic and social structures, political systems and religions.

b. The interrelationship among events and historical trends in the United States and elsewhere in the world.

c. The interaction among peoples of different national origins, races, and cultures and how such interaction has shaped America.

d. The chronology and impact of political events; development of governmental, economic, and social institutions; technological and environmental changes, and changes in social, economic and cultural values.

5. Social Science: College entrants will need the following basic knowledge and skills in the social sciences.

a. The ability to understand basic information developed by the social sciences, including statistical data and other materials.

b. Familiarity with the basic method of the social sciences, that is, with the framing and empirical testing of hypotheses.

c. A basic understanding of at least one of the social sciences and of how its practitioners define and solve problems.

d. Familiarity with how to explore a social problem or social institution by means of ideas drawn from several social sciences.

PART III: COMMITTEES SUGGEST INITIATIVES FOR IMPLEMENTATION

Each committee spent a great deal of time arriving at suggestions which would serve to facilitate the implementation of the academic competencies, or which would more generally serve to continue to promote alliances between higher education and public education within the state. The suggestions of each committee are summarized below.

Proposed Initiatives for Language Arts

1. General

   a. Before making the Basic Academic Competencies graduation requirements, the SDE should insure that classroom teachers, not just district superintendents or curriculum specialists, receive and discuss Academic Preparation for College and companion volumes.

   b. High schools and the postsecondary institutions their students attend, rather than a state agency, should specify graduating students' level of performance in each competency.

   c. English and foreign language departments in postsecondary institutions and their corresponding departments in the local school districts should establish ongoing professional collaborations.

   d. Faculty at secondary and postsecondary institutions should establish ongoing professional relationships with their legislators.

2. Foreign Language Instruction

   a. The SDE should establish a specialist's position in foreign languages comparable to the specialist positions in other academic areas.

   b. Professional associations of foreign language educators and the Foreign Language Specialist, once appointed, should discuss foreign language competencies required of New Mexico's mono-lingual students and of its bilingual students and distinguish among such competencies if necessary.

3. Teaching Environments and Academic Expectations

   a. The New Mexico legislature should immediately finance Section 22-2-8.2, Paragraph A, of Senate Bill 106 to insure manageable class sizes in elementary schools.

b. As soon as possible, the New Mexico legislature should amend Section 22-2-8.2, Paragraph B, of Senate Bill 106 to limit English class enrollments in secondary schools to 25 or fewer students per class and writing teachers' total student load to 100 or fewer students. Then the legislature should finance that amendment.

c. As soon as possible, the New Mexico legislature should fund and school districts should limit enrollments in Foreign Language classes to 20 or fewer students.

d. Teachers and parents should expect high academic performance.

e. Teachers should assign, collect, and respond to homework regularly.

f. Local schools, parents, and the community should develop policies and plans for students who work part-time.

4. Language Across the Curriculum

a. The SDE should revise Educational Standards for New Mexico Schools to stress the Basic Academic Competencies as appropriate teaching goals in every subject area, not just the areas with which they've been traditionally associated.

b. Departments in all subject areas should describe criteria and conventions for writing and speaking in their subject areas. Then they should share those descriptions with colleagues in other departments, especially English.

c. Teachers of the "Fifth Credit" course in communication skills should specifically stress the Basic Academic Competencies.

d. The SDE should encourage state and district textbook selection committees to judge how well textbooks are written as well as what they say or what they include.

5. Professional Development and Communication

a. The New Mexico legislature and the SDE should encourage and financially support additional National Writing Project sites in New Mexico. To help New Mexico's bilingual students, leaders of those sites should include foreign language and ESL teachers in planning and presenting the project institutes and in-services.

b. The SDE should establish an information referral service.

c. The New Mexico legislature, SDE, and administrators of postsecondary institutions and public school districts should connect school districts with postsecondary institutions through a statewide data transmission network.

6. Testing and Assessment

a. Before identifying methods of assessing competencies, the SDE should solicit comments from teachers in high schools and postsecondary institutions statewide.

b. Because of limitations inherent in any type of assessment, a statewide assessment committee and the SDE should consider a variety of assessment methods. They should consider but not limit themselves to nationally standardized tests, state-written tests, local district tests, teacher-written tests, and direct observations by teachers.

7. Computer Competency: As quickly as is economically feasible, school districts should incorporate word processing into the writing curriculum, first through the language arts instruction or the English Department, later in writing instruction across the curriculum.

Proposed Initiatives for Fine Arts

1. General Recommendations

a. Recognize that the arts are integrally related to what it is "to be human" and that individuals who are selective and sensitive in their surrounding themselves with the beautiful in the arts is the ultimate objective for aesthetic educators.

b. Recognize the contribution of Southwest, Native American, and Hispanic culture to the regional and national artistic scene.

c. Recognize that, as noted in Academic Preparation in the Arts: Teaching for Transition from High School to College, p. 25:

> The arts are distinct fields of study: they deal with different materials and problems and have different methods and

purposes from mathematics, languages, science, or social studies.

Consequently, the study of the arts can make a distinctive contribution to high school students' development. When this study includes all three components---making or performing artworks, learning to analyze and evaluate art, and knowing artworks of various periods and cultures---then it can teach students to understand and pursue quality, to be expressive and responsive, to exercise their imaginations, and to be interested in the visions and inventions of others. The challenge for teachers of the arts is to keep the eyes of students open to these many possibilities and help them develop the special knowledge, sensitivity, and skills that training in the arts offers.

2. <u>The Committee saw the following as barriers to the implementation of the competencies in the Green Book.</u>

   a. The general lack of understanding of the importance of the arts.

   b. The lack of linkage between the arts as taught in the public schools and colleges, i.e., visual artists not talking with performing artists, public school educators not communicating with college and university faculty.

   c. A lack of a communication network among <u>all</u> the artistic entities in the region, including the colleges and universities, galleries, the New Mexico Symphony, the Santa Fe Opera, the Roswell Symphony, the public schools, etc.

   d. A lack of arts curriculum continuity from kindergarten through twelfth grade: high school teachers not communicating needs to middle school and elementary schools, and the reverse.

   e. The lack of a lobbyist in Santa Fe to work with the legislature.

   f. Geographical barriers in the state which make frequent, face-to-face meetings difficult.

   g. The lack of music and art specialists in the elementary schools in the state.

h. The lack of certification for Theatre/Dance or Drama teachers in the public schools.

i. The lack of a heritage of assessment in the arts. The Committee wishes to go on record as welcoming and supporting an assessment program that would carefully measure the progress our students make in the fine arts as they proceed through grades 3, 5, 8, and 12.

3. In coping with these barriers and overcoming them, and to successfully implement the competencies for fine arts as based on the College Board Green Book as modified for use in New Mexico, the concept of an organization representing all the fine arts was established. That group is charged with the following responsibilities:

   a. The distribution of a listing of all arts groups in the state along with membership requirements, chief executive, meeting time and place, and contact person.

   b. The distribution of a calendar of meetings where it is appropriate to present the case for fine arts in the schools as a vital segment in the total education of individuals.

   c. The conducting of regional meetings to inform public school teachers, administrators, local school board members, higher education faculty, and the general public of the importance of aesthetic education and the adoption by this committee of the College Board's guidelines (as amended) for New Mexico.

4. Three subcommittees were formed to address the issues raised in Item 4a, b, c. These are listed below:

   a. Legislative Action Committee

   b. Teacher Preparation Committee

   c. Information Dissemination Committee

5. These subcommittees working under the heading of the Fine Arts Committee for Quality Education (FACQE) desire to continue to meet and seek CHE/SDE support for their continued operation. Such an ongoing organization could work to:

   a. Re-establish Theatre, Drama, and Dance certification in New Mexico.

b. Amend Senate Bill 106 passed by the 1986 New Mexico Legislature to include fine arts as a requirement for graduation.

c. Heighten sensitivity to the need for music and visual arts specialists in the state's elementary schools.

d. Establish reasonable guidelines for the number of "pull-outs," i.e., classes/days missed due to curricular, co-curricular, or extra-curricular activities.

e. Examine FACQUE's relationship with a revitalized New Mexico Alliance for Art Education to work toward building a power base in the state.

Proposed Initiatives for Mathematics

The mathematics committee feels that there are four areas of implementation of the basic mathematics competencies for college bound students in the state of New Mexico. The four areas are communication, training, curriculum expansion and evaluation of the competencies. The committee feels that each of these broad areas is equally important, but the lists of implementations for each of the areas is written in order of priority.

1. Communication

a. The SDE is the best source for communicating the math competencies to superintendents, school boards, administrators, teachers, counselors, students, parents, businesses, and legislators. This can be done through regional conferences, workshops, the media, journals, and newsletters.

b. It is recommended that a small advisory group be appointed to help the SDE assemble and disseminate information to the groups listed in #1. (It is felt that a higher level of leadership in mathematics is needed at the SDE level.)

c. It is recommended that local schools communicate with parents and guardians regarding college preparation courses. It is also suggested that letters be sent to parents and guardians of students in grades 8 through 12.

d. There are established resources, such as college faculties, MAA, NEA, NCTM, NMCTIM, NMSTA that can help disseminate information.

e. Video tapes should be made for use in dissemination of the competencies and initiatives.

2. Training

a. Curricula for pre-service and in-service training for teachers who will teach or do teach mathematics at any level, should be reviewed.

b. On the basis of that review, a committee should be appointed by SDE to standardize the above criteria.

c. Institutions of higher learning that are involved in the training of mathematics teachers should implement the standardized curricula.

d. Standards of licensure for current and future teachers of mathematics, at all levels, should be reviewed and upgraded.

e. Opportunities for upgrading should be made available to teachers by:

(1) local school districts providing incentives; and

(2) higher education making coursework available through a variety of means, such as workshops, correspondence courses, summer sessions, mobile teacher centers, NSF institutes, etc.

3. Curriculum

In order to implement the Academic Preparation for College Project, we recommend the following curricular priorities:

a. We believe that mathematics should be a senior year required course for every student.

b. The full potential of the technological tools, calculators and computers, should be used in the teaching of mathematics.

c. Educators should be fully aware of current curricular trends that are being initiated to meet the needs of students in our changing society and should incorporate these changes into the state curriculum as appropriate.

d. Textbooks should be carefully chosen to meet the objectives and standards identified for this project.

4. Evaluation: The committee realizes that there are no national standardized tests, at this time, for

evaluating many of the competencies that have been recommended. It also realizes that paper and pencil testing will not suffice for some of the competencies. It is, therefore, recommended that research and development of evaluation tools be a priority that would be initiated immediately upon adoption of the basic competencies for college bound students.

Proposed Initiatives for Science

The following initiatives should enhance the ability of our educational system to help students meet the competencies just described. The initiatives are listed approximately in the order of preference. The criteria used to reach this ordering included: (1) the potential that the initiative would improve instruction of the competencies and detailed knowledge, (2) the number of teachers and students that would be affected, and (3) the cost and effort needed to institute and operate the initiative. Several costly initiatives were considered so important for improving the quality of instruction that they received high rankings even though the expense was high.

1. Develop a coordinated district-wide curriculum that emphasizes the use of communication, reasoning, math, study and other competencies in most classes (a united competency development across the curriculum program). Students should learn reasoning skills in social studies and language classes just as they should improve their communication and study skills during science classes. Model curricula might be developed by SDE for voluntary adoption by local school districts. Alternatively, a committee of select teachers, school administrators, and university faculty from across the state might be given release time to develop a model curriculum for voluntary adoption by school districts.

2. Develop a regular cooperation between SDE, school teachers, school district administrators, the universities, and professional organizations in activities such as suggesting curricula change, programs to meet competencies, and methods for testing competencies and for teacher evaluation. The SBE and the SDE should take responsibility for forming this group and should seek regular funding to support the group's activities.

3. The college and universities in the state should develop science courses for their elementary and secondary education majors that are models for the type of instruction that we expect of these future teachers. These courses should include many hands-on activities, laboratory activities, and demonstrations. We cannot expect teachers who take science courses at a

university that are taught in a moderately formal lecture manner to use a more concrete hands-on method of instruction with their younger students. We suggest that CHE work with the Academic Council on Higher Education of New Mexico colleges and universities who can in turn encourage the appropriate administrators and faculty at their colleges to develop these courses.

4. The state needs regional centers at which teachers learn about and develop activities for teaching science competencies. (These centers can be used for training in all disciplines and might be located at community colleges, universities, or at public school facilities such as the Teacher Centers in Las Cruces and Albuquerque.) In science, special emphasis would be given:

   a. to hands-on classroom activities for elementary teachers to use in developing their students' science competencies, and

   b. to laboratory activities, demonstrations, and teaching methods that junior high and high school teachers can use to develop competencies while introducing new concepts.

   These centers might serve as sites for extended, intensive workshops for interested teachers who, after participating in these workshops, could give a series of short after-school workshops for other teachers in their locality (a pyramid approach that reaches a larger number of teachers). This program should receive funding from the state (and possibly the federal government) and would probably be a project that SBE and SDE should oversee. People chosen to offer these workshops and to develop the activities should be selected on the basis of competitive proposals to the state.

5. In order to attract talented persons to the teaching profession and to retain the talented teachers now in the profession, the pay of teachers must be increased. The SDE must get the support of the governor and the state legislature to help finance pay increases for teachers.

6. Teachers responsible for laboratory instruction need extra time for setting up, taking down, and repairing the equipment used in the labs. We recommend that teachers be given one free period for every two different laboratory-preparation courses for which they are responsible. The SDE should work to get this recommendation into effect.

7. Due to the nature of science with its concurrent laboratory activities and due to safety considerations, laboratory courses need adequate facilities and should have no more than 24 students per laboratory session. The SDE should work to get this recommendation into effect.

8. The SDE should communicate with SAT and ACT organizations and with textbook publishers concerning our need to have tests and textbooks that reflect the desired competencies so that teachers will have the resources and feel the need to include these competencies in their instruction.

9. The SDE in cooperation with teachers and administrators should develop teacher evaluation methods such as peer review, or pre- and post-testing of students on competencies and detailed knowledge.

10. The SDE should encourage the state to adopt certified and qualified standards for science teachers so that teachers in one discipline are not forced to teach a different science discipline with which they have little familiarity.

11. Standardized testing should be developed for New Mexico students. The tests should reflect the competencies and conceptual knowledge that we wish students to gain in their education. Feedback from the tests to students and their counselors should help direct students into classes that address their weaknesses. The SDE should take responsibility for this activity in cooperation with select teachers and administrators.

12. Efforts to encourage parent involvement in a student's education are encouraged. One suggestion that SDE could support involves preparing a short list of the competencies and the courses that students should take (a flow chart) in junior and senior high school in order to be well prepared for college. This information should be provided to parents before students register for 7th grade courses. A special effort should be made to encourage all students, and especially minorities, to take higher level courses as long as possible so that a wider range of career options remain open to them.

13. Develop a traveling interactive museum, exploratorium, and van program. The van program could offer workshops for teachers in remote locations as well as in more metropolitan areas. In addition, the Visiting Scientist Program administered by the New Mexico Academy of Science should be reinstated. The SBE and SDE should secure funding for these activities from the state legislature.

14. Recognize a Higher Education Day to allow students to "sit in" on classes at universities and community colleges. This statewide recognition could perhaps be given by a governor's proclamation. The special day might occur during one of the teacher in-service days so that students would not miss any regular school.

15. Counselors need training programs relative to student advisement so that doors to future career opportunities remain open as long as possible. Average students should be encouraged to take more challenging courses in math and science.

16. Develop a mechanism for getting feedback to the high schools on how students are doing in the crucial first year and to communicate successes and failures between high school and college teachers. In particular, have higher education teachers let individual high school teachers know about individual student progress, perhaps during an in-service day. The SDE might ask the universities how best to achieve this goal.

17. Encourage the high schools to offer a learning and study skills course in the high schools. The course would include explicit instruction concerning skills such as discussed in the section entitled "Studying" in the College Board Green Book on page 10. These skills include, among other things, note taking and test taking techniques, setting priorities, using resource materials, and methods to learn and to use specialized vocabulary.

18. The SDE might take whatever actions are needed to utilize two-year college facilities to provide courses for undergraduate and graduate credit for teacher certification.

19. The SDE might (1) place College Board publications in school and public libraries, and (2) make a short list of the competencies for students to take home and for teachers to have at their desks.

20. The SDE might develop a "Visiting Teacher Program" using people from the universities, community colleges, and industry to help schools with a shortage of teachers.

Proposed Initiatives for Social Studies

The following methods of implementing criteria are suggested. Implementation strategies are broken into two groups: one relating to classroom criteria, the other to preparation of teachers. Each of the groups are ranked, with those which the

committee considered of top priority listed first, and those which it considered least important listed last. Indications are also given as to what the committee feels would be the funding requirements for each item.

1. Classroom Criteria

   a. Require four units of social studies for high school graduation. These would include one unit each of U.S. history, world history, economics/civics and an elective. There should also be emphasis (whether as specific courses, or as part of required courses) in areas including geography and New Mexico history/government/ culture. This would probably require moderate additional funding.

   b. Each student in every class should have a copy of the textbook used for that class which they can take home. It is the belief of the committee that this could be accomplished without additional funding.

   c. There should be increased state funding which would provide adequate support materials (including materials for libraries, maps, quality textbooks and resource materials for the classrooms). There should also be more direct purchase funds allocated from the state (perhaps a 70/30 split). This suggestion for implementation would require additional funding.

   d. Social studies classes should maintain a pupil-teacher ratio ceiling of no greater than 28-1. This would require significant additional funding.

   e. There should be expanded articulation between postsecondary and secondary schools of the success levels of their students at the college/ university.

2. Teachers

   a. The committee recommends that teachers at the secondary school level be required to have a baccalaureate degree in a content field (a BA or BS) plus an additional year of education courses and teacher training, with the following criteria:

      (1) the first four years of college work should include heavy emphasis on subject material;

      (2) to be certified in any subject the teacher must have fifteen (15) hours of class work in that subject;

(3) prospective teachers should be required to take a full semester (12-14 hours) of student teaching; and

(4) although waivers could be granted, teachers should have to move toward satisfaction of certification requirements with a maximum of three (3) years being given to meet them.

Because this recommendation would require much more professional preparation on the part of teachers than is now required, it would have to be linked to significant salary increases for beginning teachers who meet the requirements. This proposal would require significant additional funding.

b. Summer institutes and special workshops in specific areas of social studies should be offered by postsecondary institutions to meet teachers' needs. This proposal would require additional funding.

c. Recertification courses should be required to be in teaching content areas only. This should not require additional funding.

d. Significant financial incentives should be offered to teachers who take additional courses in their subject areas. This would require additional funding.

e. Colleges and universities should offer more subject area courses in the evening and on weekends. These should be offered through instructional television and at extension centers as well as at on-campus locations. This would require limited additional funding.

Institutional Research Recommendations

The data acquisition and report committee developed a list of data items for district, high school and individual level reports from colleges and universities. Although most of the data items are currently available in data collected by the state CHE or on data tapes of the American College Testing Service, the consensus of the committee was that additional information was needed on applicants for admission and progress of first year freshmen.

It was proposed that the CHE develop an undergraduate admissions applicant file and request institutions of higher education to report the data to the Commission staff who will compile and disseminate reports to both postsecondary and secondary

institutions. Additionally, the CHE student file should be expanded to include individual grades by course for the freshman year.

This data collection effort will result in summary reports for the public school districts with the possibility of individual student reports issued for cost of processing upon written request by the school superintendent. The following is an outline of proposed summary reports.

A. District and High School Level Summaries

1. Entrance Studies

a. Number of first time applicants from high schools who graduated the previous spring.

b. Number of first time applicants from the high schools who enrolled as first time freshman and their percent of the freshman class.

c. Summary of admissions status: provisional, full, etc.

d. Summary of declared majors.

2. Test Performance Study: Mean ACT/SAT scores for students with a frequency distribution by test score.

3. Developmental Education Study: Number and percent of students enrolled in remedial education with tables indicating: enrollment in reading, writing, mathematics and study skills; number of remedial courses.

4. Outcome Studies

a. Average grades by academic subject by high school GPA.

b. Attrition rates.

c. Graduation rates (longitudinal studies).

B. Individual Student Studies

1. College/University attending.

2. Admission status.

3. Declared major.

4. High School GPA as reported on the transcript.

5. High School GPA if recalculated by the institution.
6. Hours enrolled in during the academic year.
7. Course grades earned during academic year.
8. First year GPA.
9. Enrollment in remedial courses by subject matter.
10. ACT/SAT scores.

PART IV: CONCLUSION

The plan for this project calls for the final report to be submitted for review and support by the Commission on Higher Education and the State Board of Education after statewide review and endorsement by various constituencies in the educational community. And since it is recognized that academic preparation is not just for the college bound, but that students who enter the work force directly from high school need many of the same academic competencies as do those going on to college, the final report of this project will also be widely distributed to the New Mexico business community for further review and comment.

As reflected in the initiatives recommended to implement the competencies, there are additional significant implications of this project for program quality enhancement, program review, teacher training, articulation, admission standards, and remedial education. A joint meeting of the Academic Council on Higher Education and the Instructional Council on Higher Education is being planned for April 1987 to address articulation issues including intrastate transferability of credits and degrees and to discuss the recommendations of the Academic Preparation for College Project. Resources will need to be identified in higher education as well as in the public schools to implement worthwhile initiatives. Quality enhancement funding on a competitive basis at the state level is one way to see that some of the recommended actions are supported.

In conclusion, the staff of the SDE and the CHE recommend that the academic competencies as presented in the College Board's publication Academic Preparation for College - What Students Need to Know and Be Able To Do and as edited by the academic area committees and detailed in the corresponding "Rainbow" books be adopted for distribution by the SBE and the CHE. In addition, we suggest that a concerted effort be made to begin work in implementing these competencies and studying the suggestions made by the subject area committees and the data acquisition and report committee which would serve to promote collaboration between the higher education and public school communities in New Mexico.

APPENDIX

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